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## Commander, Navy Medicine West Visits NMRC Headquarters and Lab

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Commander, Navy Medicine West, Rear Adm. Bruce L. Gillingham puts on double ear protection during a blast tube demonstration at the Naval Medical Research Center, Silver Spring, Md. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md. – Naval Medical Research Center (NMRC) Commanding Officer, Capt. John W. Sanders welcomed Commander, Navy Medicine West, Rear Adm. Bruce L. Gillingham to the NMRC headquarters and lab for a visit to the facility, May 11.

Upon arrival Gillingham was greeted by Sanders as well as NMRC Executive Officer Capt. Elizabeth Montcalm-Smith and NMRC Senior Enlisted Leader Chief Hospital Corpsman Jerrold Diederich.

A tour, led by NMRC directorate and department heads provided an overview of the lab to Gillingham during his visit. On the tour Gillingham had the opportunity to meet with NMRC's Infectious Diseases Directorate (IDD) Head, Dr. Kevin Porter; Operational and Undersea Medicine Directorate (OUMD) Head, Dr. Stephen Ahlers; OUMD Undersea Medicine Department Head, Capt. David Regis; and, OUMD NeuroTrauma Department Head, Dr. Richard McCarron.

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## NMRC Commanding Officer's Message



This month there were two events that highlighted some of the activities of Navy Medicine Research and Development. During the Surgeon General's Leadership Forum, Dr. David Neri from the Navy Bureau of Medicine and Surgery provided an excellent overview of some of this past year's accomplishments entitled "From Ebola Response to a Malaria Vaccine." In his presentation he described the remarkable work performed in producing Ebola Virus test kits, deploying mobile laboratories to Liberia, and taking the lead in staffing and training clinical response teams. He also described the exciting results of the latest trials of a novel malaria vaccine which has shown over 80 percent protection in challenge studies. Sandwiched between these infectious disease topics, he also described the activities of each of the research commands and described the deployment of medical equipment developed by Navy Advanced Medical Development for en route care of injured service members.

On May 14, Frank Kendall, Under Secretary of Defense for Acquisition, Technology, and Logistics hosted the first Pentagon Lab Day. It was a day to show off the work of the DoD research labs. During his opening remarks Kendall said the Lab Day is the first in an ongoing outreach campaign that ties together science and technology efforts across the defense research and engineering enterprise. More than 100 exhibits highlighted the research and development work of 60 DoD laboratories representing the Army, Navy and Air Forces. One exhibit tent focused on medical research and development. Navy Medicine R&D provided information about the work at each of the eight medical research commands, ranging from medical modeling to prevention of aerospace mishaps, and brought display examples highlighting work in infectious diseases, advanced osseointegration prosthetic development, and bone marrow support and tissue transplant. We provided a lot of information to the attendees who stopped by our displays, and I am sure I will be getting requests for more information about the work we do.

NMRC Commanding Officer sends,  
John. W. Sanders III, CAPT, MC, USN

## NMRC Executive Officer's Message

Later this month I will detach NMRC, where I proudly served as Executive Officer for the last three years. Upon detaching I am to execute my orders that will take me to Joint Base Fort Sam Houston in San Antonio, Texas. Once there, I am to serve a two-year tour as Commanding Officer, NAMRU-San Antonio. My family and I are excited about our move to the Lone Star State.

On a personal note, and an odd twist to the change concept that defines our lives, I will be serving at a site not two hundred feet from my place of birth. I could not depart NMRC, nor would these orders have been remotely possible, without each and every one of you -- the men and women of NMRC -- who serve our nation every day on the forefront of scientific curiosity, exploration and discovery. I want to thank you for allowing me to serve alongside you these past few years and "letting me in" to see your wonderful work. Change is consistent in the Navy; there are advancements, promotions, orders that create PCS moves and difficult farewells.

Change takes us out of our comfort zone, but its inevitability is about as constant as Avogadro's number. Last year Admiral William H. McRaven, Commander, United States Special Operations Command, gave the commencement address at his alma mater, the University of Texas at Austin, where the slogan is "What Starts Here Changes the World." In his remarks to the graduating class, Admiral McRaven explained, if each graduating student changed the lives of ten people, and this continued across five generations, the UT Class of 2014 would have affected the lives of 800 million. Now think of what we are doing at NMRC. Imagine how many lives will be changed by your work. By the vaccines for Dengue and Malaria. By research on Blast, TBI, PTSD and Osteo-Integration. By NMRC's Mobile Testing Labs in Liberia. Who quietly faced fear. Faced death. Then created change. Lasting change in the form of survivors. In the form of contributions to scientific communities far beyond the grey hull of NMRC.

All of you were a vital part of this and I thank each and every one of you for your contribution and allowing me to serve as your Executive Officer. I wish you a fond Farewell, Fair Winds and Following Seas!



NMRC Executive Officer sends,  
Elizabeth Montcalm-Smith, CAPT, MSC, USN



# NMRC Enterprise Junior Officer of the Year 2014: Lt. Joseph Diclaro-Significant Work in West Africa

Story courtesy of NAMRU-3 Public Affairs



Preventive Medicine Technicians of the Armed Forces of Liberia learn how to perform WHO Insecticide Resistance bioassay at NAMRU-3. (from Left to Right) Lt. Diclaro, Pfc Nador, Pfc Morris, and Mrs. Reham. (Photo taken by Rafi George)

CAIRO – The U.S. Naval Medical Research Unit No. 3's (NAMRU-3) Lt. Joseph W. Diclaro was selected as the Naval Medical Research Center (NMRC) Enterprise Junior Officer of the Year for 2014.

Chosen by a board representing NMRC and the subordinate laboratories, Diclaro's selection was based on his leadership of the Vector Biology Research Program at NAMRU-3 and his vision in expanding capacity and laboratory activities in West Africa.

"Naval history is replete with tales of victories won by innovative Sailors responding with vigor and resilience in challenging circumstances. Lt. Joseph Diclaro stands clearly in that tradition," said NAMRU-3 Commanding Officer, Capt. John Gilstad in recognizing Diclaro's outstanding achievements.

Diclaro was responsible for the oversight of nine projects at twenty study sites, spanning seven countries. In particular, he opened new areas of collaboration in West Africa. For instance, in Liberia, Diclaro made key in-roads with academic, military and government partners keen

on expanding scientific, training and clinical opportunities with NAMRU-3.

During Operation Onward Liberty in Liberia, he supported the Joint Task Force through the development of an integrated vector management plan.

He assisted the Armed Force of Liberia (AFL) in human and laboratory capacity building for malaria vector surveillance and malaria microscopy. He also developed and presented a Public Health and vector management training course with attendance of 21 AFL students and he developed an online General Entomology course for the Biology Department, University of Liberia.

In collaboration with the Walter Reed Army Institute of Research (WRAIR), he conducted field evaluation of prototype vector surveillance equipment and evaluation of vector lures and repellants.

He worked with the Navy Entomologic Center of Excellence to develop and deliver Public Health and Vector Management training courses for officials in the Liberia National Malaria Program.

He catalyzed the establishment of a laboratory for malaria and arbovirus vector surveillance at the Liberia Institute for Biomedical Research (LIBR), and as the Ebola crisis emerged in Liberia, Diclaro assisted in the retooling of these new assets to set up LIBR's Ebola Diagnostic Laboratory, one of the first in the country.

With a regional vision, Diclaro engaged the East-West Africa Malaria Task Force (EWAMTF) and provided a two week entomology training course for 24 health officials from 14 West African partner nations. He pioneered collaboration with Calabar Institute of Tropical Diseases Research & Prevention in Nigeria to establish capacity for surveillance and detection of malaria in Cross River State.

In Egypt, he fostered the continuing support that NAMRU-3 provides for sand fly surveillance and control, and Leishmania detection for the Multinational Force and Observers in the Sinai.

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During the tour Gillingham had the opportunity to view the setup of an NMRC mobile laboratory.

Back in October 2014 NMRC researchers deployed to Liberia assisting in the global effort to combat the West African Ebola epidemic. Gillingham was shown each aspect of the mobile lab and given a brief synopsis of the work the mobile lab teams were performing in Liberia.

Porter escorted Gillingham into the insectary, which is shared by Navy and Army, to receive an overview of NMRC efforts in battling infections such as Malaria and Dengue Fever. There were also in-depth discussions on the research efforts of combating other infectious diseases like traveler's diarrhea and scrub typhus, and also wound infections.

The tour concluded with a visit to the facilities, hyperbaric decompression chambers and blast tube area. In the blast tube area, Gillingham was able to witness a demonstration of the device, which is used to understand how blasts may cause traumatic brain injuries.

NMRC is headquarters to the Naval Medical Research and Development Enterprise. Its mission is to conduct health and medical research, development, testing, evaluation, and surveillance to enhance deployment readiness of DoD personnel worldwide.



Commander, Navy Medicine West, Rear Adm. Bruce L. Gillingham looks into a container filled with *Anopheles* mosquitoes bred in the Insectory. *Anopheles* mosquitoes are one of the species capable of transmitting the malaria parasite to humans. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

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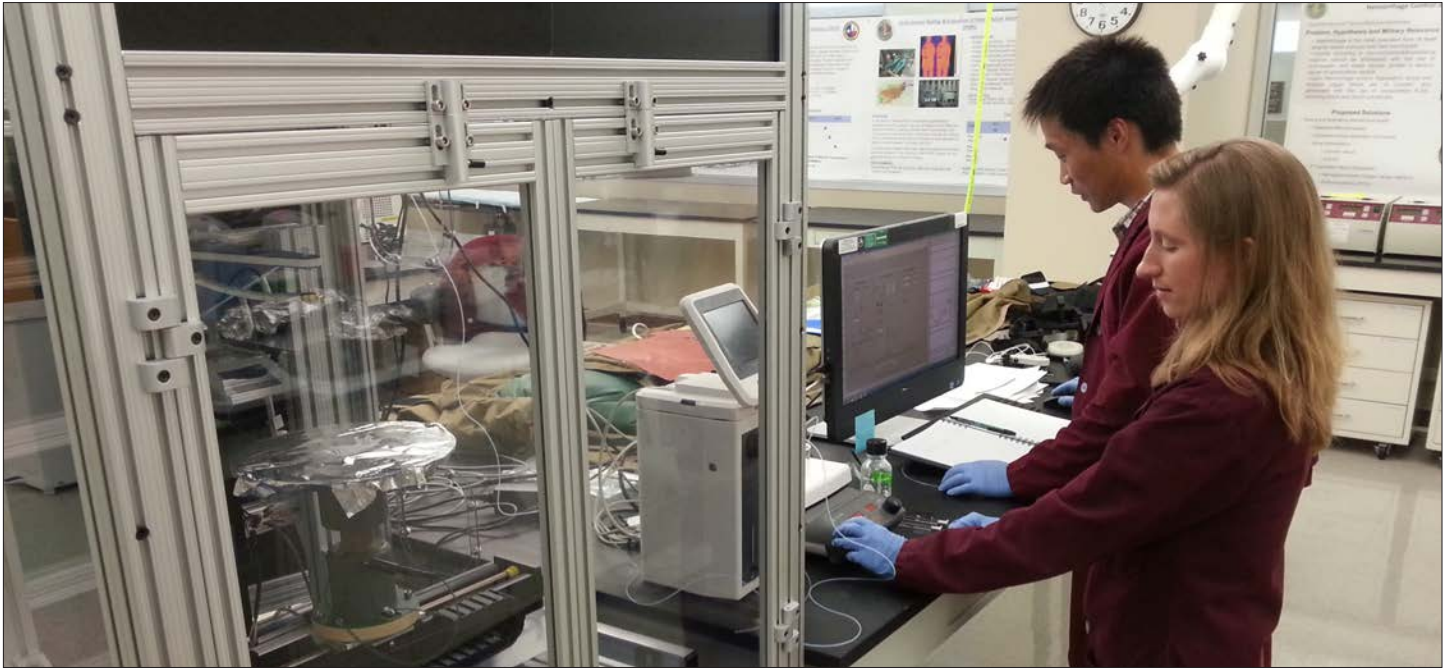


Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs



# San Antonio Lab Reaches New Level by Being Interdisciplinary

Story by Dr. John Simecek, Cmdr. David Leal, and Capt. Johnathan Stahl



Dr. Natalie Forbes (front), Postdoctoral Fellow, and Mr. Tony Yuan (back), Postgraduate Research Intern, electrospinning a nanofiber scaffold to create a biomimetic wound dressing. (Photo courtesy of NAMRU-SA Public Affairs)

(Story has been edited for space and reprinted with permission from the Editor Naval Science and Technology Future Force Magazine.)

**SAN ANTONIO** - The military and civilian medical research communities acknowledge their best individual efforts cannot fully address today's complex and interconnected problems. Being located on Joint Base San Antonio, Texas, where many injured warfighters receive care at the San Antonio Military Medical Center, means Navy researchers at the Naval Medical Research Unit – San Antonio (NAMRU-SA) see first-hand the need for change.

NAMRU-SA has developed a new model for scientific excellence. Strategic planning leads to thoughtful scientific hiring to create interdisciplinary teams designed to “attack” a problem from numerous pathways. This approach encourages scientists to think imaginatively and network with other researchers to form

collaborations and leverage resources. Internal collaborations, interservice collaborations, and fiscal efficiency characterize NAMRU-SA approach to the business of research.

NAMRU-SA is reengineering wound healing, infection control, and dental treatments with a diverse team of scientists and clinicians from across the United States, including molecular and cellular biologists, biomedical engineers, microbiologists, immunologists, physiologists, and healthcare specialists including surgeons and dentists.

To improve medical outcomes related to NAMRU-SA's mission and capabilities in combat casualty care and craniofacial health and restorative medicine, this approach makes great scientific sense.

## **Reengineering Wound Healing**

NAMRU-SA's integration of scientific disciplines and a value-conscious approach to research provides an

interdisciplinary view of the problem under investigation and leads to cutting-edge solutions and product-driven research.

For example, recent statistics show approximately 65 percent of battlefield injuries are related to head, face, or neck trauma and antibiotic-resistant infections in these areas increase death, illness, and direct costs of treatment by 30 to 100 percent.

Improved craniofacial wound management and infection control is essential for decreasing morbidity and mortality in Sailors and Marines, controlling healthcare costs, and improving service members' quality of life in terms of both function and esthetics. NAMRU-SA launched an initiative involving biomedical engineers, cell biologists, immunologists, mechanical engineers, biomaterials experts, and dentists.

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# Navy Medicine R&D Participated in the first DoD Lab Day at the Pentagon

Story by Doris Ryan, Naval Medical Research Center Public Affairs



*Pentagon Hosts DoD Lab Day. Navy Petty Officer 1st Class Mark Salvador of the Naval Medical Research Center demonstrates how a field containment kit is used to test viruses such as the Ebola virus during the Department of Defense Lab Day at the Pentagon in Arlington, Va. May 14. (Department of Defense photo by EJ Hersom)*

SILVER SPRING, Md. – The Naval Medical Research Center (NMRC) joined over 60 Department of Defense laboratories at the first DoD Lab Day at the Pentagon, May 14.

The event showcased innovations from the Navy, Marine Corps, Army, Air Force and medical research laboratories and engineering centers. More than 100 exhibits were visited by DoD personnel and congressional staff, high school STEM students and many others who saw some of the military's cutting edge science, medicine, and technology breakthroughs.

"What we see today is innovation," said Frank Kendall, Under Secretary of Defense for Acquisition, Technology, and Logistics, during the opening ceremony. He added, "There are so many different areas that the Department of Defense depends on, that our warfighters depend on, where we need to be some of the best of the best or ahead of everyone else."

NMRC had the opportunity to highlight its effort in supporting Operation United

Assistance in West Africa as team members who were in Liberia during the Ebola epidemic set up a display of one of the two deployed mobile labs. The team members spoke about their experience and expanded on their mission in advance research to develop products and methods to protect against biological attacks and infectious disease outbreaks of public health concerns.

NMRC researchers discussed novel therapeutics for the treatment and prevention of wound infections including phage therapy against *Acinetobacter baumannii* and *Staphylococcus aureus*. In addition researchers are working to identify targets for vaccines for the prevention of skin and soft tissue infection associated with multidrug-resistant organisms.

Infectious disease subject matter experts were on hand to talk about work in developing vaccines, therapeutics and diagnostic assays for viral and rickettsia diseases like Dengue fever and scrub typhus. Information on the Navy's latest

developments in malaria vaccine research was available. Malaria is a parasitic disease that U.S. military forces are at risk of developing while deployed in endemic areas and malaria was ranked No. 1 by the DoD Infectious Disease Prioritization Expert Panel in April 2010.

Also highlighted was a next generation R&D prototype in prosthetic development focused on osseointegration, a new technology designed to help the warfighter, which includes industry support and civilian partnerships.

A representative from the NMRC managed C.W. Bill Young DOD Marrow Donor Program talked to attendees about the marrow donor program as well as the Bone Marrow Research Directorate that provides military contingency support for casualties with marrow toxic injury.

The NMRC displays set up in the Pentagon Central Courtyard were representative of the work done by the research and development commands. NMRC is the headquarters for Navy Medicine's research and development laboratories that are engaged in a broad spectrum of activity from basic science in the laboratory to field studies at sites in remote areas of the world to operational environments.

In support of the Navy, Marine Corps, and joint U.S. warfighters, researchers study infectious diseases; biological warfare detection and defense; combat casualty care; environment health concerns; bone marrow research and registry; aerospace and undersea medicine; medical modeling, simulation and operational mission support; and epidemiology and behavioral sciences. The goal for all the labs is to deliver high-value, high-impact research products to improve readiness and to support and protect today's deployed warfighters.



# Bone Marrow Registry Info and Testing Available From Branch Health Clinic Bangor

Story by Douglas H. Stutz, Naval Hospital Bremerton Public Affairs



Hospital Corpsman 1st Class Shaun Aragon, a New Mexico native and Hospital Corpsman 2nd Class Jacob Wilson, from Corona, Calif. field questions from Jesse Alva, of Naval Hospital Bremerton's Outpatient Record department about the C.W. Bill Young Department of Defense (DOD) Bone Marrow Registry, April 22. Aragon and Wilson set up on NHB's Quarterdeck to provide information and walk-up testing for the Bone Marrow Registry. (Photo courtesy of Naval Hospital Bremerton)

BREMERTON, Wash. (NNS) -- Naval Hospital Bremerton's Branch Health Clinic (BHC) Bangor set up walk-in testing for the C.W. Bill Young Department of Defense (DOD) Bone Marrow Registry, April 22.

"I volunteered to help out because there are eight kinds of cancer in my family," said Hospital Corpsman 1st Class Shaun Aragon, a New Mexico native, who along with Hospital Corpsman 2nd Class Jacob Wilson, staffed the registry for a number of hours in the middle of the week.

The entire registration process is easy to follow with minimal instruction. There is one page to fill out for contact information and another for health history. Then the actual testing is done by taking a sample from a person with four cheek swabs.

That coded information (no names or social security numbers are used for identification purposes) will then be added on the National Marrow Donor Program registry where it will remain until a volunteer's 61st birthday.

Jesse Alva, of NHB's Outpatient Records department stopped by and asked about the registry program with questions on several issues.

"Does it hurt? And what if I change my mind at the last minute," asked Alva.

"It does hurt," replied Aragon, also adding that the main accomplishment they were trying to do at that time, beside let people know about the program, was to get people to sign up, and realize there are no strings attached.

"The biggest thing for us today is to get like matches. And we can only do that if someone signs up which is easy and can be done in less than five minutes. No one is obligated. If someone is eventually contacted, they can always say no," Aragon added.

The C.W. Bill Young Marrow Donor Registry is a Department of Defense entity but is part of the larger National Marrow Donor Program's 'Be The Match' world-wide registry used to match potential bone marrow donors to patients.

The entire registration process is user-friendly and free. To be eligible, a prospective donor must be active duty or a family member, National Guard, Reservist, U.S. Coast Guard or DoD employee, in reasonably good health and between ages 18 and 60.

When asked why she was signing up, Hospital Corpsman 1st Class Dawn Dillow of NHB's Multi-Service Ward exclaimed, "Why not? I always donate during our quarterly blood drives, and this is another way of saving a life."

According to the C.W. Bill Young DoD Bone Marrow Program, an estimated 30,000 children and adults in the United States, more than 500 of them in the Department of Defense, are diagnosed each year with leukemia, aplastic anemia (a rare auto-immune deficiency disease) or other fatal blood diseases.

For many a bone marrow transplant is their only hope. Because tissue types are inherited and some tissue types are unique to certain racial or ethnic groups, a patient's best chance is within his or her ethnic and racial group.

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# US Naval Medical Research Unit No. 6 Peru hosts the Commander of Navy Medicine East

Story courtesy of NAMRU-6 Public Affairs



Commander of Navy Medicine East and the 17<sup>th</sup> Director of the Medical Service Corps, Rear Adm. Terry J. Moulton recently visited NAMRU-6 as part of a key leader engagement with the Peruvian Navy. (Photo courtesy of NAMRU-6 Public Affairs)

LIMA, Peru -- Commander of Navy Medicine East and the 17<sup>th</sup> Director of the Medical Service Corps, Rear Adm. Terry J. Moulton recently visited U.S. Naval Medical Research Unit No. 6 (NAMRU-6) as part of a key leader engagement with the Peruvian Navy.

To further support U.S. 4<sup>th</sup> Fleet Global Health Engagement efforts, Moulton arrived to Peru with a team from U.S. Southern Command, the Bureau of Medicine and Surgery, 4th Fleet and Naval Hospital Beaufort, SC. He met with the Peruvian Surgeon General, Rear Adm. Rafael Zariquiey, and the Deputy Commander of Amazonian Operations, Rear Adm. Jorge Luis Rocha Carbajal.

NAMRU-6 Commanding Officer Capt. Kyle Petersen briefed the visitors on the unique Naval partnership between the United States and Peru since the founding of NAMRU-6 in 1983. He also discussed NAMRU-6 efforts in vaccine and diagnostic development, and regional

bio-surveillance. During his visit Moulton received a tour of Centro Medico Naval (CEMENA) Hospital from Zariquiey and his team, as well as lunch in the wardroom, followed by a tour of NAMRU-6 to include an MSC officer call with the command's microbiologists, entomologists and health care administration specialists.

Moulton was also able to tour NAMRU-6's field operations facilities in the city of Iquitos in the Peruvian Amazon where he was familiarized with dengue field work and the floating neighborhood of Belem.

The highlight of the trip was a visit to the naval shipyard SIMA Iquitos to see the Peruvian Navy's next two Social Inclusion Barges which are in their final stage of construction.

These state of the art medical and administrative platforms provide badly needed health care like prenatal checkups, dental visits and immunizations to remote villages in the Amazon rainforest as well

as hard to get services like government ID cards, social security benefits and even a cash machine.

NAMRU-6 has been supporting the Peruvian government with lab diagnostics for malaria for these and hope to expand their portfolio of services since the barges provide a unique platform to look for novel pathogens deep in the jungle.

The key leader engagements served to initiate a dialog about a medical officer exchange program between CEMENA and Portsmouth Naval Medical Center and to provide U.S. Navy Medical Department members future opportunities for Humanitarian Civic Assistance Projects on the river barges.

At the end of his tour, Moulton was impressed by the NAMRU-6 team for their outstanding scientific and global health efforts in Peru on behalf of the U.S. Navy and thanked everyone for a great visit.



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The team developed a novel approach to creating biocompatible nanofibers to enhance wound treatment, especially wounds to the craniofacial region.

The biocompatible nanofiber scaffold is designed to promote tissue repair by forming a surface that mimics the natural cellular environment while simultaneously releasing bioactive molecules to accelerate healing and potentially minimize the formation of scar tissue.

To synthesize the nanofibers, NAMRU-SA's biomedical engineering team constructed a custom electrospinning apparatus. The nanofiber composition and structure, including spray pattern and strand size, are readily controlled during the electrospinning process, enabling tailored nanofibers for a wide variety of biomedical applications.

Once the process is optimized, scientists will integrate nanofibers into coatings for use on medical materials to improve treatment for craniofacial injuries. These nanofibers can deliver bioactive agents at a sustained rate and can be assembled into a 3D architecture to guide cell behavior.

This endeavor has led to a collaborative effort with the U.S. Army Dental and Trauma Research Detachment to develop a novel bandage containing therapeutic agents to improve healing and decrease scar formation in military trauma patients.

The success of the electrospinning technology and nanofibrous scaffolding is directly attributable to the comprehensive team approach. Every team member brought a unique perspective and skill set.

Developing a technique and accompanying device that could transform organic elements into engineered tissue, and then transport and deliver drugs to fight infection and promote proper natural healing, is

complex and poses serious challenges. The absence of any one idea or perspective may have derailed the project or resulted in a less-than-optimal outcome.

### **Infection Control that Pushes the Edge of Technology**

Bacterial wound infections are problematic for military and civilian populations around the world. Two major challenges for successful treatment of maxillofacial (face and mouth) wounds are multidrug resistance and formation of biofilms (bacteria growing in slime-enclosed aggregates).

The high level of infection in facial injuries and the difficulties encountered during extended military evacuation procedures contribute to severe soft tissue breakdown resulting in delayed healing, increased scarring, scar contracture, deformities, long-term functional deficits, and difficulty with facial reconstruction.

NAMRU-SA is addressing these challenges by assembling an interdisciplinary team with expertise spanning chemistry, virology, molecular immunology, and structural biology to physics, mathematics, and nanomedicine to develop innovative therapeutic strategies as alternatives to conventional antibiotics.

This pioneering team proposed a two-phased approach to solving multidrug resistance and biofilms. One arm of the research focuses on using laser-induced opto-acoustic treatment, which is pulsed laser light and energy absorbing nanomaterials to physically damage the infectious agent through generation of heat and shock waves. An advantage of this approach is the efficacy of the technique at eradicating pathogens would not depend upon the level of antibiotic resistance, growth rate, or metabolic status. Another arm of the study involves developing compounds to break through biofilms to enhance the

activity of antibiotics and help debulk infectious lesions.

### **Preventive Dental Care to the Extreme**

Preventive dental care is often categorized as routine, but fractured teeth and restorations are the most commonly reported dental emergencies among military personnel. Recent statistics from soldiers serving in Iraq place the cost of these types of emergencies at more than \$20 million a year, not accounting for degradation of unit operational capability. A large number of these emergencies occur because of a gap in current dental diagnostic technology preventing accurate characterization of enamel cracks.

Transillumination uses visible light to highlight the fracture, but visible light scatters when reflected on enamel and does not allow the clinician to determine the depth or extent of the fracture. The most basic diagnostic test, X-Ray, is quick but cannot be used to evaluate cracks unless the fracture is grossly displaced.

The NAMRU-SA's craniofacial health research team is exploring adaptable industry technologies and other basic technology suitable for modification. The team of dentists, engineers, and technicians is evaluating optical coherence tomography (OCT) with the potential to provide significant diagnostic images to aid dentists in evaluating enamel cracks and the need for intervention.

OCT is a laser-based system allowing the visualization of subtle discrepancies and cracks in a tooth not seen during a routine dental exam. The laser uses nonionizing laser light to obtain subsurface images of translucent or semitranslucent materials at a resolution of better than 10 micrometers, and then creates an instant, clear 2D and 3D tissue images by rejecting background scatter

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signals or light directly reflected from the surface of interest.

No special preparation of the sample or subject is needed and images can be obtained in a noninvasive and nonionizing manner. These characteristics translate to a highly effective, quick, easy-to-use instrument with no damage to tissue.

The NAMRU-SA team is testing extracted restored and nonrestored teeth with simulated chewing stress applied by a mechanical testing device to propagate cracks. Enamel crack propagation will be evaluated using images from a Micro CT scanner and then compared to the images produced by the OCT.

On successful evaluation and development of a diagnostic predictive model, the research team will work on a handheld device suitable for military dental clinics.

### Science with a Purpose

With the current call for improved Sailor and Marine readiness and greater effectiveness for every dollar spent, the philosophy of efficient repurposing of existing technology and team-driven design of functional devices is an important step forward in a research culture that is traditionally compartmentalized and can labor unnecessarily too early in the research continuum.

The command's goal is science with a purposeful strategic plan designed to approach problems from an interdisciplinary viewpoint while leveraging resources to the greatest extent possible. The NAMRU-SA vision of decreasing time from bench to battlefield is critical to ensuring relevancy, purpose, and longevity in an ever-evolving military landscape.

The complete story is here <http://futureforce.navylive.dodlive.mil/files/2015/05/FF-Spring-2015-Final-Web.pdf>.

## NMRC/WRAIR Joint Multicultural Committee Recognizes Holocaust Remembrance Day

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs

SILVER SPRING, Md. – The Naval Medical Research Center (NMRC) and Walter Reed Army Institute of Research (WRAIR) Joint Multicultural Committee held an event in recognition of Holocaust Remembrance Day, April 17.

The event's guest speaker, Master Sgt. (ret.) Sol Goldstein, a Jewish-American who served during World War II and member of the Baltimore Jewish Council, told of his experience during key events such as D-Day and the Battle of the Bulge. Goldstein, a Baltimore native, enlisted in the Army in 1942 and at the age of 18 participated in the Invasion of Normandy. While serving in Germany, Goldstein was part of a unit that knocked down the fence surrounding a satellite camp in Buchenwald. He ended his tour in Plzen, Czechoslovakia.

Following his tour in Germany he was discharged and spent several years participating in efforts to rescue Jewish people across the globe.



Master Sgt. (ret.) Sol Goldstein, a Jewish-American who served during World War II and member of the Baltimore Jewish Council, told of his experience during key events such as D-Day and the Battle of the Bulge. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

In 1982, Goldstein made a trip to Ethiopia where he helped free Jews. He also went to Beirut, Lebanon, with the Israeli Army as an observer and made six trips to the Soviet Union to help free Russian Jews

also known as Refusniks. Goldstein is the co-founder and president of the Baltimore-based organization called the Black Jewish Forum of Baltimore (BLEWS).



# NAMRU-3 – Infectious Disease Physician Describes Rewarding Experience in Ghana

Story by Lt. Cmdr. Nehkonti Adams (posted on Navy Medicine Live)



Lt. Cmdr. Adams (center) and staff of the NAMRU-3 Ghana Detachment. (Photo courtesy of NAMRU-3 Public Affairs)

GHANA - Did you know that in addition to human beings, birds and pigs can also become infected with influenza? Establishing surveillance for diseases such as influenza is one of many accomplishments of the U.S. Naval Medical Research Unit No. 3 (NAMRU-3) Ghana Detachment. I will share with you some of the amazing work we are involved in West Africa.

First, let me tell you a bit about myself. I'm originally from Liberia and immigrated to the U.S. with my family in 1986. I grew up in Minnesota and joined the Navy shortly after high school. I started out as a deck seaman and then became an aviation boatswain's mate and I am now an infectious disease physician, assigned to NAMRU-3 located in Cairo, Egypt, but based at the Ghana Detachment in Accra, Ghana.

In 1998, NAMRU-3 scientists began malaria research in Ghana in collaboration with the Noguchi Memorial Institute of Medical Research (NMIMR) in Accra. Since then we

have broadened our scientific portfolio to include surveillance of febrile, respiratory, and enteric syndromes; influenza; and patterns of antimicrobial resistance in sexually transmitted disease, in addition to continuing work on malaria immunity and drug resistance, and field trials of diagnostics and vector control methods.

We have also been involved in Lassa fever research. Lassa fever is a viral hemorrhagic fever like Ebola, but less fatal. In the near future we hope to return to malaria vaccine development. We work closely with the Ghana Armed Forces (GAF) on several projects. One of these projects is the annual avian influenza exercise. In collaboration with GAF, NMIMR and the Ghana Health Service we conduct avian and swine sampling at six military reception stations in the country. During the exercise we educate GAF personnel and their families about influenza.

In addition to our formal role as a research organization we have had the opportunity to assist in disease

outbreaks: a Lassa fever outbreak in Liberia and more recently the West African Ebola outbreak. As Officer in Charge of the NAMRU-3 Ghana Detachment, I was called by the chief medical officer of Operation Onward Liberty requesting educational materials to be provided to deployed troops to Liberia.

I also served on Ghana's Health Service Ebola National Technical Coordinating Committee (NTCC) as a case management subcommittee member. NAMRU-3 also led an interagency Ebola team comprised of members from CDC, USAID West Africa, USAID Ghana, and various other DoD agencies to coordinate WHO, Government of Ghana, local NGOs, foreign donors, UNMEER and USG aid agencies' preparedness efforts.

Because Accra, Ghana, is the region's major international hub, an Ebola simulation exercise was conducted at Kotoka International Airport. NAMRU-3 Ghana provided expertise with a joint team from WHO, Ghana Health Services, and NMIMR to facilitate training of Ghana's Ebola Rapid Response Teams.

I have also had the opportunity to interact with the local community by participating in a health fair and speaking with local students about the importance of obtaining a good education.

In Liberia, my first name, Nehkonti, means "there is a time for everything or everything has a time." I am fortunate to be assigned to NAMRU-3 at this time and to be involved in work in West Africa that will make a positive impact.

# Assessing Warfighter Performance with Virtual Reality

Story by Amanda Markham, Naval Health Research Center

(Story reprinted with permission from Naval Science and Technology Future Force Magazine)

SAN DIEGO - To wounded warriors, participating in a virtual task in the Physical and Cognitive Operational Research Environment (PhyCORE) at the Naval Health Research Center (NHRC) in San Diego may just seem like playing a big video game. This unique environment, however, provides researchers and clinicians with the capability to conduct training and validation of physical and cognitive training programs for rehabilitation of wounded warriors with a high degree of scientific and clinical accuracy, while keeping patients engaged and enthusiastic about their recovery.

Researchers at NHRC are using novel immersive virtual environments such as PhyCORE, in addition to smaller virtual reality systems and conventional clinical and laboratory tools, to understand physical and cognitive performance in healthy and injured warfighters with the goal of improving programs and techniques for wounded warrior rehabilitation. The immersive virtual environment at the PhyCORE laboratory is a novel and effective means to support research and clinical studies that aim to understand and assess physical and cognitive performance factors of warfighters.

PhyCORE uses a state-of-the-art technological system called the Computer Assisted Rehabilitation Environment (CAREN) and additional immersion capabilities to create a realistic virtual environment that can visually imitate any environmental scene. It includes a six-degrees-of-freedom motion platform, 16 optical cameras for 3D motion capture, a dual-belt treadmill, embedded force plates, and a 180-degree, 10-foot-tall panoramic screen, which NHRC scientists use to recreate scenes such as a mountain range in Afghanistan or a bustling city street. CAREN has been expanded beyond many similar systems to include a high performance treadmill, driving and laser rifle simulators, 3-D projection, and



*The Physical and Cognitive Operational Research Environment uses a Computer Assisted Rehabilitation Environment and additional immersion capabilities to create a realistic virtual environment that can visually imitate any environmental scene such as an Afghanistan mountain range or a bustling city street. (Photo courtesy of Naval Health Research Center Public Affairs)*

realistic sounds and scents. It is all of these components working simultaneously that create life like virtual scenarios for patients and the state-of-the-art clinical research laboratory for the PhyCORE team.

Current clinical work in the PhyCORE includes assessment of rehabilitation training programs for wounded warriors such as using the CAREN for vestibular physical therapy (restoring patients' sense of balance). After a six-week training program on the CAREN, vestibular patients show improvement in CAREN-based functional tests and in traditional clinical tests for dizziness, balance, and gait.

In other work, outcomes of a two-week, clinical-based fall prevention program are being assessed on the CAREN, and patients with lower-limb amputation are showing significant improvement in their ability to prevent a fall, increased confidence in their prostheses, and

increased confidence with activities of daily living. Patients are retaining these outcomes three and six months following training.

Additional work related to the warfighter in the PhyCORE has assessed the performance of warfighters wearing different personal protective equipment. The PhyCORE research team is also one of the first groups to establish norms describing how healthy individuals perform in the CAREN. Preliminary results from this work suggest that multi-tasking training programs conducted in the PhyCORE lead to improvements in both physical and cognitive performance of injured populations.

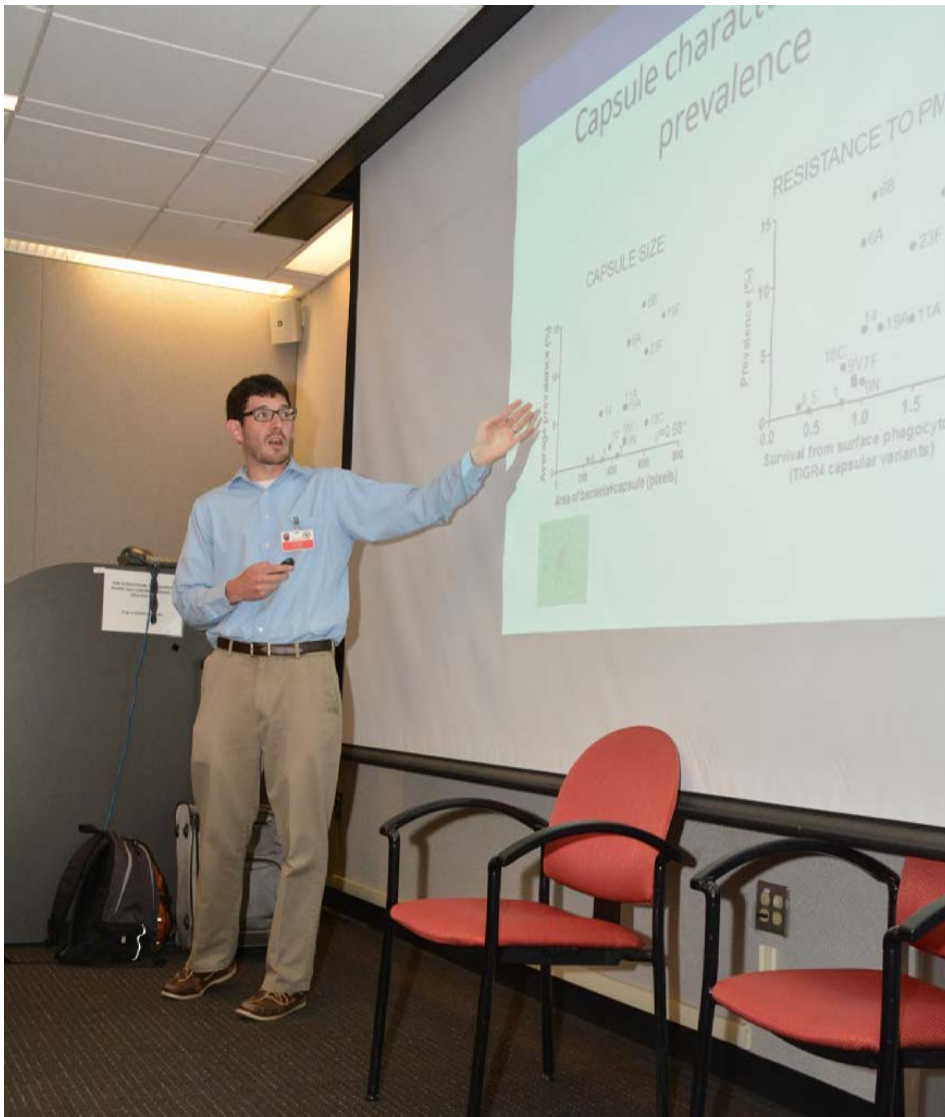
The team of scientists and researchers at NHRC will continue to develop and assess rehabilitation programs for the wounded warrior and training programs for the healthy warfighter. PhyCORE researchers

*(continued on page 14)*



# NMRC Enterics Department Welcomes Yale Professor to Speak at Seminar

Story by Dr. Milton Maciel, Naval Medical Research Center



Professor Daniel Weinberger, from the Yale School of Public Health, speaks during an Enterics Seminar on the "Ongoing challenges in estimating and predicting the impacts of pneumococcal vaccination." (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

The Naval Medical Research Center (NMRC) Enterics Department welcomed Professor Daniel Weinberger, from the Yale School of Public Health, to speak during a seminar on the "Ongoing challenges in estimating and predicting the impacts of pneumococcal vaccination," April 29.

The currently available pneumococcal vaccines, manufactured through

conjugation of polysaccharides from pneumococcus capsules to a protein carrier, are able to elicit immunity against otitis and/or invasive diseases in 60-80 percent of vaccinated children. Immunization leads to clearance of the serotypes targeted by the vaccine and replacement by other, less virulent strains.

A survey of vaccinated children shows that, while the incidence of

pneumococcal diseases decays, the level of pneumococcus carriage remains stable, but represented by serotypes other than those covered by the vaccine.

Although the elderly population can also benefit directly from vaccination, the reduction in carriage seen in children might represent the main mechanism by which the incidence of pneumococcal disease also drops in that group, an example of herd immunity.

Another part of the seminar was dedicated to describe a new tool developed in Weinberger's laboratory.

The Vaccine Impact Confidence Evaluation software, or VICE for short, is a web-based platform to evaluate the likelihood of detecting the true change associated with vaccination given specific parameters such as seasonality, number of expected cases, number of years after vaccination and others.

The software was developed as part of a Bill and Melinda Gates Foundation grant and it can be used to assess the impact of different vaccines.

The seminar was of special interest for researchers at the NMRC where conjugated vaccines, such as the anti-Campylobacter, are being developed.

In addition, understanding of the impact of multivalent vaccines, as the anti-pneumococcal, in disease and carriage, can be relevant for the development and evaluation of multivalent vaccine currently in development at the NMRC, as for example the Enterotoxigenic *E. coli* vaccine.

# NMRC IDD Holds a Seminar on Phage Therapies in Albert R. Behnke Auditorium

Story courtesy of Naval Medical Research Center Public Affairs

The Naval Medical Research Center Infectious Diseases Directorate (IDD) held a seminar in the Arthur R. Behnke Auditorium at Forest Glen, Silver Spring, Maryland, April 17.

The guest speaker of the seminar was Dr. Carl R. Merrill, a retired U.S. Public Health Service Captain and Emeritus Scientist at the National Institutes of Health (NIH).

The topic, "Phage Therapies: Potentials and Barriers," covered numerous areas of Merrill's research who had a distinguished career in scientific medical research for over forty years, delivered an informative seminar on bacteriophages, a special class of bacterial viruses capable of killing bacterial organisms with remarkable specificity and can potentially be developed as antimicrobial agents in the future.

Historically, the limited application of phages as treatment for infectious diseases may be attributable to the discovery and development of antibiotics, the lack of properly designed studies to support advancement of phage as novel treatment for infections, the rapid elimination of phage by the immune system and lack of knowledge on the phage, bacteria, and host interaction.

Merrill developed an interest in phage research and saw the potential in phages as novel therapeutic agents against infectious diseases and focused his effort on answering two important questions: (1) Can phage affect humans? (2) If phages are capable of killing bacteria, why aren't they being used as treatment against infectious diseases.



Guest speaker, Dr. Carl R. Merrill, a retired U.S. Public Health Service Captain and Emeritus Scientist at the National Institutes of Health (NIH). (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

He conducted a revolutionary experiment in which he demonstrated that bacterial viruses (or phages) can express bacterial enzymes in mammalian cells, including human cells; this experiment was an early example of genetic engineering.

Currently, there is renewed interest in phage research. Funded through the Congressionally Directed Medical Research Program (CDMRP), scientists in the NMRC Wound Infections Department (WID) and Biological Defense Research Directorate (BDRD) are collaborating with research investigators at the Walter Reed Army Institute of Research Wound Infections Department to develop a therapeutic "cocktail" of phages effective

against a broad range of *A. baumannii* strains and *S. aureus*, including Methicillin-resistant *S. aureus* (MRSA).

Merrill observed complex interactions among phage, bacteria and in mice and believed that through properly designed studies, researchers should develop a thorough understanding of interactions among phage, bacteria and humans.

He designed and conducted experiments to study the effect of phage in mice, and discovered that phages given intravenously did not stay long in the circulatory system because phages were taken up in the liver and spleen.

## Assessing Warfighter Performance with Virtual Reality

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also plan to transition the lessons learned within the virtual system to the clinic or the field to reduce rehabilitation times and improve outcomes for the wounded warrior and provide performance feedback measurements to help healthy warfighters.

As the Department of Defense's premier

deployment health research center, NHRC's cutting-edge research and development is used to optimize the operational health and readiness of the nation's armed forces. Within proximity to more than 95,000 uniformed service members, world-class universities, and industry partners, NHRC's expert team sets the standards in joint ventures,

innovation, and practical application.

Story at this link: <http://futureforce.navylive.dodlive.mil/files/2015/05/FF-Spring-2015-Final-Web.pdf>



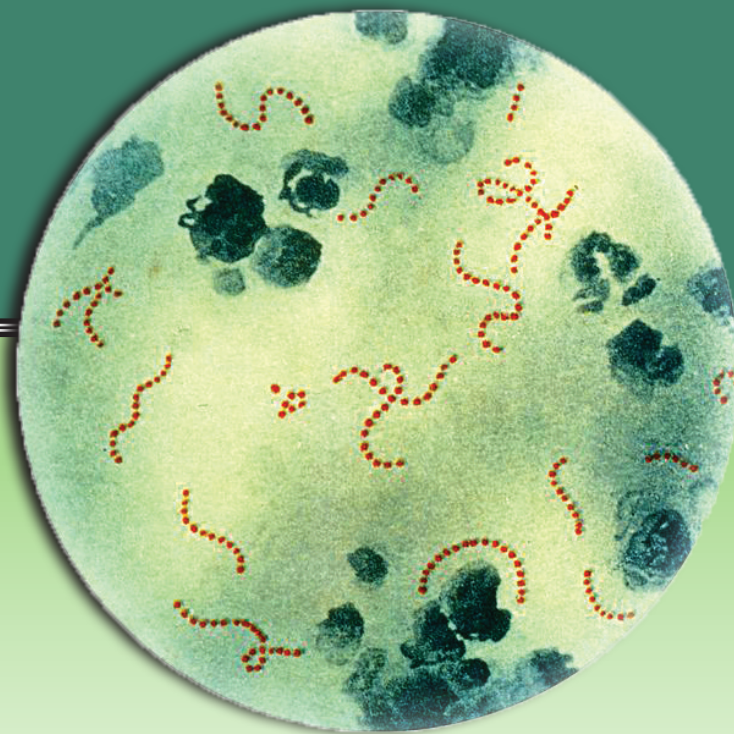
## R&D Chronicles

# The Curious Story of Navy Medicine and the Fight Against Rheumatic Fever Part I

By Andre B. Sobosinski, Historian, Bureau of Medicine and Surgery

“[Rheumatic Fever] is not numbered among the—shall I say?—spectacular maladies. You don’t hear much about it. Someone has characterized it as a condition ‘which licks the joints but bites the heart.’ It is one of the most dangerous, disabling afflictions known to mankind. It claims thousands of new victims each year yet its cause remains unknown and we are still groping in the dark as to its treatment and cure.”

~Rep. Carl Vinson (D-Georgia), May 1946



Rheumatic fever is a debilitating disease caused by A streptococcus (*Streptococcus pyogenes*), the same bacteria responsible for strep throat and scarlet fever. Usually manifesting two to three weeks after a throat infection, the condition can lead to severe joint pain, involuntary muscle movements, fever, and irreparable damage to heart valves and even heart failure (rheumatic heart disease). Owing to the advance of antibiotics, rheumatic fever is largely a forgotten threat in developed nations today, but it wasn’t long ago that the ailment resulted in one of the leading causes of valvular heart disease in the United States and the very reason for establishing a naval hospital and research laboratory in Dublin, Georgia.

Between 1900 and 1930, rheumatic fever related valvular disease (*cordis valvulorum morbis*) accounted for 156,120 sick days and invalidated 2,871 from service in the Navy. During World War II, with the Navy and Marine Corps populations peaking at the largest levels in history, the impact of infectious diseases like rheumatic fever posed a very serious threat to readiness. In 1943, more than 3,000 Sailors developed rheumatic fever. On average rheumatic fever cost each patient about 60 days on the sick list and, according to one Navy report, “break the morale of the patient.”

Beginning in 1943, the Bureau of Medicine and Surgery (BUMED) sought to establish “special purpose” hospitals and a research laboratory dedicated to acute rheumatic fever. At the time, the Naval Hospital in Corona, California, had been used for this purpose, but with increased demands for the hospital’s other services, the facility no longer proved adequate. Early proposals called for the establishment of rheumatic fever hospitals in Florida and southern California, each offering warm locales deemed ideal for treating patients. West Palm Beach, Clearwater,

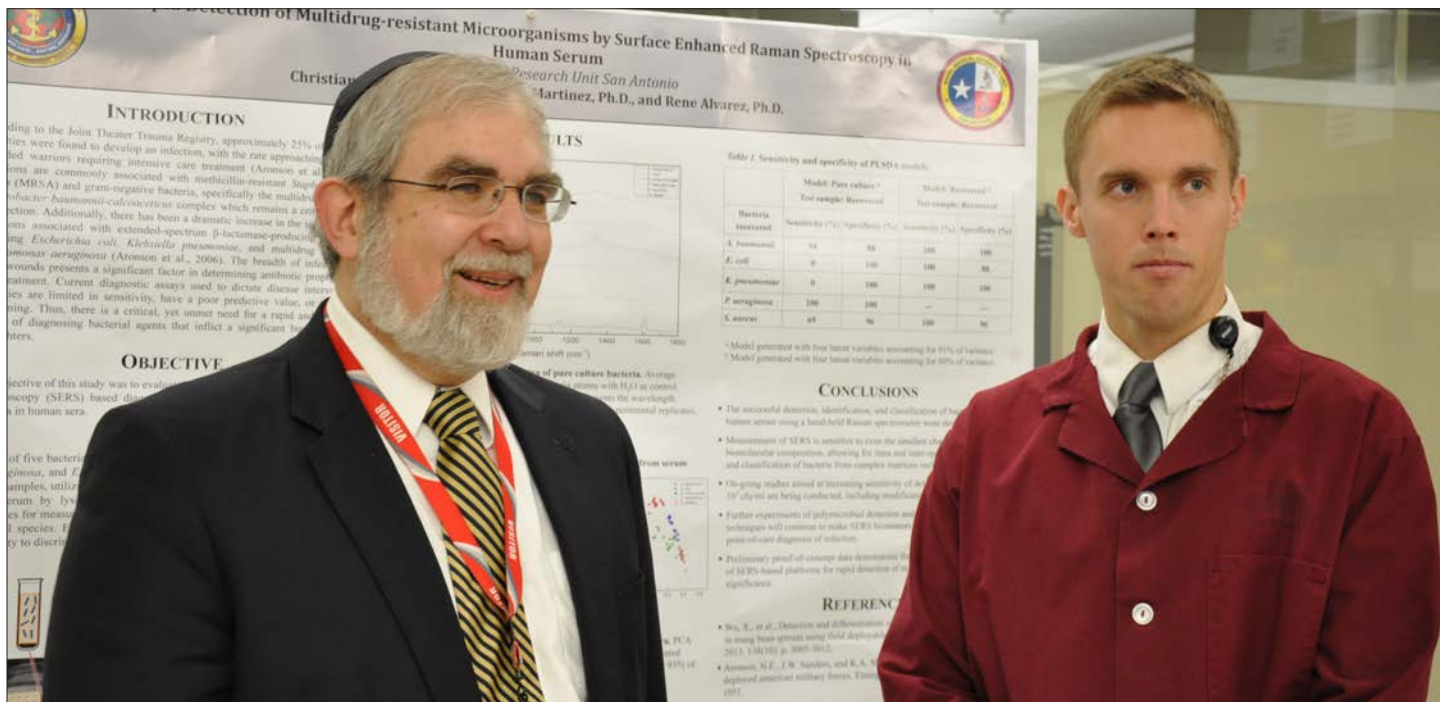
and Daytona, Florida, and Beverly Hills and Palm Springs, California, were each proposed as prospective homes for the new facilities.

In 1943, under the guidance of Lt. Cmdr. Alvin Coburn, MC-V(S), USNR, a pioneer in the field of rheumatic carditis, the Navy Medical Department outlined a new treatment plan for all rheumatic fever cases. All acute patients would be treated promptly with salicylate, a non-steroidal anti-inflammatory drug, and then placed in a restricted ward dedicated for rheumatic fever patients. After blood sedimentation rates were deemed normal, patients would be transferred to a special convalescent hospital where they would continue to be treated with salicylate and mandatory bed rest. As patients showed fewer clinical symptoms and inflammation subsided, their activity levels would be increased until eventually they were returned to duty. Coburn asserted that the Navy’s execution of this plan would be “regarded by American Medicine as a great advance in the solution of the clinical problem of an important disease.”

The next step in the fight against the disease was to establish the special convalescent facility.

# University of Pittsburg Vice-Provost Challenges NAMRU-SA Postdoctoral Fellows

Story by Flisa Stevenson, NAMRU-SA Public Affairs



Dr. Carey D. Balaban, Vice Provost for Faculty Affairs at the University of Pittsburg (left), and Dr. Christian N. Kotanen (right), Postdoctoral Fellow in NAMRU-SA's Combat Casualty and Operational Medicine Directorate, during a tour of the NAMRU-SA facilities. (Photo taken by Flisa Stevenson, NAMRU-SA Public Affairs)

SAN ANTONIO –Carey D. Balaban, Ph.D. Professor and Vice Provost for Faculty Affairs at the University of Pittsburg challenged NAMRU-SA's postdoctoral fellows with keen and pointed advice about successfully pursuing translational research and collaboration, during his visit to the Naval Medical Research Unit – San Antonio (NAMRU-SA) earlier this year.

Balaban has a broad knowledge about the research landscape and how to navigate research administration. He advised the postdoc's to learn the clinical work related to their own area of research.

"Doing significant translational research that is practical and innovative requires you to ask the right questions and anchor your work in reality. Research scientists need to work in collaboration with clinicians to imbed the right information," said Balaban.

Balaban also discussed the importance of bringing the right attitude into the endeavor. He compelled NAMRU-SA's young scientists to do something that is leading to someplace important.

"Don't just meet the minimal publishing units," said Balaban. "Do something that makes a difference and makes the world a better place."

During a tour of the laboratory, NAMRU-SA's postdoctoral fellows introduced Balaban to the lab's translational research projects to reengineer wound healing, infection control, early diagnosis of bacterial agents, and dental treatments. Balaban was impressed by the quality of the staff and the research being conducted at NAMRU-SA.

"People should really know what you have here," said Balaban. "It is a unique environment."

In a discussion session, a postdoctoral fellow asked Balaban, "What makes a successful postdoctoral experience?"

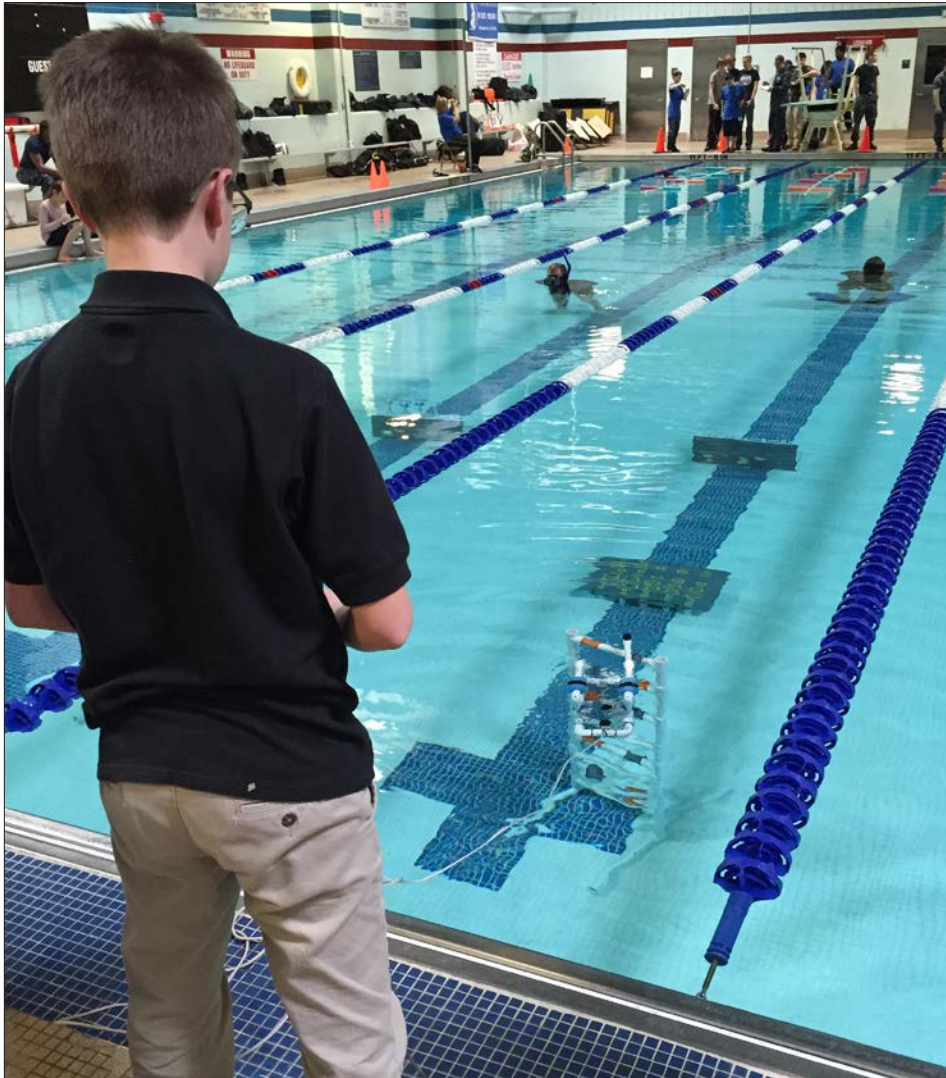
In his closing remarks Balaban emphasized, "Papers and networking." He encouraged the fellows to express their unique insight and show how different they are through their writing, and to talk to more people in the field.

Balaban is a recognized physician-scientist and expert on the neurobiology of balance control, oral pain psychophysics and inner ear toxicology. He has a long standing interest in translational science, and in addition to more than 120 basic research articles, Balaban's laboratory developed new patented technologies to gauge situational awareness and cognitive engagement from postural orienting responses.



# NSMRL Supports the 2015 Connecticut STEM SeaPerch Program

Story courtesy of NSMRL Public Affairs



STEM student with an underwater remotely operated vehicle (ROV). (Photo courtesy of Lt. Christopher Rodeheffer.)

GROTON, Conn. – The Naval Submarine Medical Research Laboratory (NSMRL) diver locker and other volunteers assisted with the in-water support for the 2015 Connecticut STEM (Science, Technology, Engineering, Math) SeaPerch Program, March 23.

SeaPerch is an innovative underwater robotics program that equips teachers and students with the resources to build an underwater Remotely Operated Vehicle (ROV) in an in-

school or out-of-school setting.

“The in-water support consisted of swimmers and divers re-setting the task event and obstacle courses, and the maneuverability course for the SeaPerch underwater rovers. The in-water support ensured the event was able to occur in a timely manner and that every student team had a fair and equal opportunity to perform to the best of their ability,” said NSMRL’s Lt. Nathan Moss.

The SeaPerch Program provides students with the opportunity to learn about robotics, engineering, science, and mathematics while building an underwater ROV as part of a science and engineering technology curriculum. The student teams build ROVs from kits comprised of low-cost, easily accessible parts, following a curriculum that teaches basic engineering and science concepts with a marine engineering theme.

Building a SeaPerch ROV teaches basic skills in ship and submarine design and encourages students to explore naval architecture and marine and ocean engineering principles. Throughout the project, students learn engineering concepts, problem solving, teamwork, and technical applications.

The name “SeaPerch” comes from the USS Perch, a highly decorated World War II submarine. According to Mr. Harry Bohm, the inventor of the original SeaPerch, the submarine was one of a new breed of American submarines and was the first to incorporate an early form of air conditioning.

She was launched May 9, 1936, by the Electric Boat Company in Groton, Connecticut, and was scuttled by her crew in the Java Sea March 3, 1942, after being severely damaged during a Japanese depth charge attack two days earlier. The crew was captured and sent to a Japanese prisoner of war camp; all but six of the 54 men and five officers onboard returned home after the war. Her wreckage was discovered in November 2006 by an international team of divers off the coast of Java and was the object of archeological diver exploration.

# Cairo Laboratory Employee Earns 2014 Biosafety Hero Award

Story courtesy of NAMRU-3 Public Affairs



Dr. Atef El Gendy (left) is congratulated after receiving the Hero Award. (Photo courtesy of NAMRU-3 Public Affairs)

CAIRO – The U.S. Naval Medical Research Unit No. 3's Dr. Atef El Gendy was recently recognized as the International Federation of Biosafety Association's (IFBA) winner of the 2014 Biosafety Hero Award.

The IFBA created the Biosafety Heroes program to identify and celebrate extraordinary individuals who make significant contributions to help others in the field of biosafety and biosecurity. Dr. El Gendy's outstanding work in organizing and teaching biosafety, biosecurity and infection control symposia and workshops either through his work in capacity building and training at NAMRU-3 or through his professional relationship with

other organizations, made him clearly deserving of this award.

"Dr. El Gendy's colleagues at NAMRU-3 have long appreciated his can-do attitude and initiative. We are thrilled he has been recognized for his biosafety expertise by an international committee," said NAMRU-3 Executive Officer, Capt. Patrick Blair.

Selected by an international panel of his peers, Dr. El Gendy was chosen based on his ability to operate in an environment in which biosafety funds are limited. His understanding of the importance of biosafety and biosecurity and spreading that understanding to others in his region

was cited in the award.

Dr. El Gendy, Head of the Bacteriology Section of the Bacterial and Parasitic Disease Research Program at NAMRU-3, also serves as the President of the African Biological Safety Association and is a council member of the Arab Biological Safety Association.

Dr. El Gendy also volunteered to serve as the American Society for Microbiology (ASM) Ambassador for Egypt, and earlier as the ASM Ambassador for North Africa and Middle East Region from November 2004 to November 2009.



# NMRC Welcomes Children for Take Our Daughters and Sons to Work Day 2015

Story and Photos by Mikelle D. Smith, Naval Medical Research Center Public Affairs

SILVER SPRING, Md. - Personnel at the Naval Medical Research Center (NMRC), alongside Army counterparts from the Walter Reed Army Institute of Research (WRAIR), welcomed children for Take our Daughters and Sons to Work Day, April 23. The children were able to participate in numerous activities related to research and development with the help of volunteers from the Navy and Army.

According to the web site, The Take Our Daughters And Sons To Work Foundation is dedicated to developing innovative strategies and research-based activities in informal educational programs that empower girls and boys in all sectors of society to confront and overcome societal messages about youth so that they may reach their full potential and live fulfilling lives. Through its leadership, expertise, and collaborations, the Take Our Daughters And Sons To Work Foundation advocates for changes in social policy and public awareness on behalf of youth.



## Bone Marrow Registry Info and Testing Available From Branch Health Clinic Bangor

(continued from page 7)

Since 75 percent of the patients in need of a marrow transplant cannot find a match within their own family, a strong national database is essential for identifying potential donors.

The larger and more diverse the National Marrow Donor Registry becomes, the greater the chance of finding life-saving matches.

The former coordinator of the program, Lt. Cmdr. Katie May

explained that when she went through the Peripheral Blood Stem Cells (PBSC) procedure, she received daily injections to increase the number of blood stem cells in the bloodstream for four days before the collection and a fifth injection on the day of collection.

Her blood was then removed through a sterile needle in one arm and passed through a machine that separated out the blood stem cells with the remaining blood returned through the other arm.

The other procedure is the bone marrow method, where the donor has less than five percent of their marrow collected from the back of their pelvic bone using a special needle and syringe. It's a simple surgical procedure performed while they are under general or local anesthesia. Donors usually stay overnight in the hospital.

# GROTON Lab Volunteers Judge 4-H Club International Food Show

Story courtesy of NSMRL Public Affairs



NSMRL volunteer HM2 Anthony Harris (right) sits with a New London County 4-H member as he prepares to judge the 4-H Club International Food Show. (Photo courtesy of NSMRL Public Affairs)

GROTON, Conn. - Naval Submarine Medical Research Laboratory (NSMRL) Diversity Program volunteers supported the New London County 4-H Club, March 28, 2015. Lt. Nathan Moss and HM2 Anthony Harris were the community judges in the 4-H International Food Show competition. There was a variety of dishes from different countries - Japan, China, India, Italy and Ireland cuisines were represented.

"Participating was a wonderful experience," said Moss, "The 4-H'ers that participated really worked hard to put good tasting, visually inviting and healthy food on the table. The competition was very hard to judge as every dish was well made. I very much

look forward to another opportunity to help out our local New London County 4-H clubs."

During the competition the children, three to 15 years old, presented their individual dishes by explaining why they chose that particular dish native to the country. They explained the recipe and the time they dedicated to preparing the dish.

"As a community judge I was to choose the best represented table and provide positive feedback to the children," noted Harris.

The group chosen as a favorite had an Irish theme, the menu included Irish soda bread, beef slow cooked stew,

corned beef, cabbage and potatoes and for desert they served a buttery shortbread with an Irish tea. At the end of the event everyone was acknowledged as winners.

"The complexity of some of the dishes allowed me to see the time and effort put in by each group preparing for the event. What was most satisfying was the attitude and sense of accomplishment the children presented regarding the positive feedback for their hard work," said Harris. "Work in the military can have you on edge sometimes. This was a great opportunity to interact with the young population around our local area and decompress after a long week of work."



# Juniors and Seniors From JSHS Symposium Visit NMRC

Story and Photos by Mikelle D. Smith, Naval Medical Research Center Public Affairs

Juniors and seniors in high school participating in the National Junior Science and Humanities Symposium (JSHS) held in Hunt Valley, Maryland, visited Naval Medical Research Center (NMRC), May 1.

The visit, as part of practical hands-on experience in a research and development atmosphere as it relates to Science, Technology, Engineering and Mathematics (STEM) initiatives, was coordinated by

various NMRC and Walter Reed Army of Institute of Research (WRAIR) personnel.

The students were greeted by NMRC Commanding Officer, Capt. John W. Sanders and other NMRC researchers, during an opening remarks ceremony following numerous activities dealing with research and development.

WRAIR also participated in the efforts to educate the students on research and

development work performed by the Army at the facility.

2015 marks the 53rd year the U.S. Navy, Army and Air Force have sponsored JSHS. The symposium brought together more than 230 high school students who qualified to attend the event by submitting and presenting original scientific research papers in regional symposia held at universities nationwide.

